DOCUMENT RESUME

ED 160 144 95 JC 780 503

AUTHOR Cohen, Arthur M.; Hill, Andrew

TITLE Instructional Practices in the Sciences, Spring 1978.
INSTITUTION Center for the Study of Community Colleges, Los Angeles, Calif.
SPONS AGENCY National Science Foundation, Washington, D.C.
PUB DATE Sep 78
NOTE 18p.

EDRS PRICE MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS Agriculture; Biology; Chemistry; Class Size; Community Colleges; Course Objectives; Economics; Engineering; Enrollment Trends; Females; Grading; Instructional Media; *Junior Colleges; Males; Physics; Psychology; Questionnaires; *Science Instruction; *Surveys; *Teacher Attitudes; Teacher Characteristics; *Teaching Methods

ABSTRACT

As part of an investigation of science and science-related curriculum and instruction, a survey was conducted of science instructors from 175 two-year colleges; the colleges were selected to be representative of region, size, and means of college control. Instructors of every thirteenth science course section offered in Fall 1977 were surveyed. Of the 1569 deliverable surveys, 1275 (85%) were returned. This paper summarizes responses to questions on class size, course objectives, teacher expectations, use of class time, use of instructional media, satisfaction with and source of instructional materials, student class activities, stressed competencies, grading practices, attendance requirements, interdisciplinary approaches, assistance in teaching, means of course improvement, and instructor's background. The average initial class size for all courses was 32; the average number of course completers was 25. Larger class sections tended to be taught by faculty members with the most experience. The male to female ratio for engineering courses was five to one, for agriculture and physics courses was two to one, and for biology courses was one to two. Science instructors tended to allocate 45% of class time to lectures, with economics instructors lecturing most. The instructor survey is appended. (MB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED160144

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Arthur Cohen

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

INSTRUCTIONAL PRACTICES IN THE SCIENCES, SPRING 1978

CENTER FOR THE STUDY OF COMMUNITY COLLEGES

Los Angeles, California

September, 1978

Arthur M. Cohen

&

Andrew Hill

JC 780503

The Center for the Study of Community Colleges, under a grant from the National Science Foundation, is engaged in a study of curriculum and instruction in two-year college science and science-related technologies. Using a nationwide sample of 15% of the colleges (N=175), balanced by region, size, and college control, the Center sampled instructors from every 13th science course section offered in Fall, 1977. Of the 1569 deliverable surveys, 77 were sent to instructors of class sections that had been canceled; 1275 surveys were returned (85%). Following is a summary of the findings.

Average initial enrollments per class for all science courses:...32

Average number of students who completed the course and received grades:.....25

Average by discipline:

	Initial enrollment	Received grades	Percent completed
Agriculture	26	23	88%
Anthro & Interdisciplinary Social Science	30	24	80%
Biology	39	31	79%
Chemistry	30	24	80%
Earth/Space	34	26	76%
Economics	35	28	80%
Engineering	24	19	79%
Interdisciplinary Sciences	26	21	81%
Math	28	20	71%
Physics	24	21	88%
Psychology	39	32	82%
Sociology	35	29	83%

Larger class sections tended to be taught by faculty with the most experience. Faculty with less than 3 years experience had an average of

29 students per section, whereas 37 students were enrolled in classes taught by instructors with 11 or more years of teaching. Part-time instructors also tended to teach smaller classes.

Engineering courses enroll five times more males than females, and agriculture and physics both had male-female ratios in excess of 2 to 1. On the other hand, females outnumbered males 2 to 1 in biology courses, mainly on the strength of predominantly female enrollments in the allied health fields. Psychology courses also showed a high proportion of females.

Instructors described the level and intended audience for their class by indicating whether an assortment of descriptive statements could by used to characterize their course. It was found that 68% of the science courses were described as "parallel" or equivalent to a lower division course at a transfer institution. Around 35% of the courses were designed for transfers majoring in natural resources, allied health, physical sciences, biological sciences, and non-science majors. Thirty-five percent also indicated that their course was appropriate for further education for adults. Remedial courses were prevalent in mathematics (33% of math courses), but were scarcely found in other areas.

Instructors were asked to choose one quality they wanted their students to achieve from sets of four objectives. In one set, 61% wanted their students to "Apply principles learned in the course to solve qualitative or quantitative problems." Bolstered by strong support from social sciences, 27% wanted students to "Understand the interrelationships of science and society." Few instructors were concerned with "Lab

techniques" (except engineering) and "The ability to understand scientific research literature."

The next set of four desired qualities showed equal support for "Relate knowledge to real world systems and problems," and "Understand principles, concepts, and terminology of the discipline." "Appreciate/understand scientific method" drew minimal support, and except for agriculture and engineering, "Hands-on field experience" was not considered important.

The third set of goals included "Develop the ability to think critically," which received 47% of the responses, "Gain qualities of mind useful in further education" drew nearly one-third, and "Learn to use tools of research" and "Understand self" were endorsed by about 9%. Although "Understand self" was not strongly supported by faculty in the physical sciences and technologies, over a third of the social science instructors wanted students to learn about themselves in class. Differences in course goals were substantial between different disciplines, but the faculty as a whole were quite consistent when the variables considered were full-time versus part-time instructor, highest degree held, and years of experience.

Another area of inquiry concerned the percentage of science courses that carried a prerequisite. Just over 40% of the instructors reported that their class had a prerequisite. Disciplinary differences in prerequisites were extreme from a low of 10% earth/space sciences and integrated sciences to a high group of physics (78%), chemistry (68%),

engineering (65%), and math (56%). Prior courses were usually used as prerequisites, whereas declaring a science major or achieving a specific exam score were rarely used.

We asked instructors to estimate how they allocate their class time between various activities over the entire term. It was found that science instructors lecture 45% of the time, with economics teachers lecturing most and engineering faculty lecturing least. Class discussions account for the next largest block of class time -- 15%. Social sciences and mathematics instructors devote over 20% of class time to discussion, the rest of the sciences were considerably lower. The area that showed the largest fluctuation in average usage was laboratory experiments by students. This was to be expected, as many classes have no lab component. Of the total sample of 1275 sections, about a third of the classes spent some time in lab work, so that although the average time for the sample was 11%, engineering and chemistry instructors devoted 30% of class time to labs, and biology and physics used over 25%. The only other activity that took up an appreciable amount of class time was quizzes and exams. They accounted for 10% of the class time, and were evenly balanced across disciplines, with math using them slightly more than others.

Other classroom activities were used sparingly. Student verbal presentations, simulation/gaming, and guest lectures were used little, mostly in social science courses. Field-trips were rarely noted except in agriculture courses, where 58% of the classes took off-campus excursions. Media presentations accounted for 5% of class time. Only 12% of the math

instructors used any form of reproducible presentation. Lecture/demonstration experiments and laboratory practical exams took up small percentages of class time.

Because different forms of media are often integral to attempts at instructional innovation, we asked the instructors to indicate how often they used them. Around half the instructors used maps, charts, illustrations, displays; overhead transparencies; and films. Overhead transparencies and slides were the two media most likely to be developed by the individual instructors. Although only 30% of the sample used slides, they were utilized by over 75% of the instructors in biology, agriculture, and earth/space sciences. Single concept film loops were rarely seen except in physics and biology, and filmstrips were utilized frequently in agriculture, integrated sciences, and sociology. Audiotapes, cassettes, and records, videotapes, and audiotape/slide/film combinations were all used by around 20% of the instructors. Three-dimensional models were frequently employed in chemistry (92%), and biology (76%) courses. Natural preserved or living specimens were extensively used in biology and agriculture classes, but did not appear in any other disciplines. Full-time faculty were more likely than their part-time colleagues to utilize almost all of the aforementioned instructional aides, and they were also more likely to develop their own materials. There was a surprising lack of difference in the use of media between small, medium, and large colleges.

We asked about the type and quantity of written materials used in class. Naturally, nearly all instructors used textbooks. Syllabi and handout materials

were used by 62%, and 44% used lab materials or workbooks. Between 10% and 25% used problem books, newspapers, reference books, collections of readings, and journal and/or magazine articles. Approximately 80% of the biology, chemistry, and physics instructors used lab materials and workbooks. Over half the anthropology and agriculture classes utilized journal and magazine articles, Although newspapers were only used by 11% of the total group, 45% of the economics instructors found them useful. Full-time faculty were more likely than part-timers to use workbooks and syllabi.

We also were concerned with the number of pages the students were required to read. Sociology, psychology, and anthropology instructors required the most textbook reading. Faculty with more experience and full-time status asked the students to read more pages. Faculty holding the doctorate degree had the highest reading requirements. For the entire sample the average number of pages required was 308.

Most of the faculty (62%) were satisfied with their textbook, although 12% said they definitely intended changing texts. Two percent of the faculty prepared their own text. Over half of the instructors in anthropology/interdisciplinary social science, agriculture, chemistry, earth/space, integrated sciences, and psychology had total say in selecting their textbook. Only 21% of the math instructors had total say, and 35% of the math faculty had no say in textbook selection. It is interesting to note that full-timers and part-timers seem equally satisfied with their materials despite the fact that 64% of the part-time faculty did not participate in textbook selection as opposed to only 13% of the full-time faculty who were "assigned" texts.

Lab materials were widely utilized in classes where the textbook reading was lower, tending to equalize the number of pages assigned. Lab materials were prepared by 38% of the instructors who used them, and in most cases they had total say in their selection. Syllabi were used by over half the respondents, and were almost always prepared by the individual instructor. Instructors indicated that this was the reading material they were most highly satisfied with.

The instructors were asked to indicate the activities that were used to determine students' grades, and how heavily they counted. Only two activities were widely used to determine more than 25% of the students' grades: quick-score objective tests used by 60% of instructors and essay exams used by 41%. No other criteria were widely used to determine a significant percentage of the students' grades, although about one-third of the faculty graded student participation in class discussion, attendance homework, and papers written outside of class. Papers written in class, field reports, oral recitation, workbook completion, discussions with instructor, research reports, non-written projects, lab reports, practical exams, and problem sets were used in varying degrees among the different disciplines, but to a small degree for the field in general. Papers written outside of class were widely used in anthropology/interdisciplinary social science, sociology, and psychology. The only other grading criteria that were a strong determinant of grades were laboratory unknowns and/or practical exams and laboratory reports. They were heavily used in biology, chemistry, engineering, and physics.

Instructors were asked what abilities the students were expected to

exhibit. The most important trait was "Acquaintance with concepts of the discipline," which was strongly supported throughout the disciplines. In contrast, "Mastery of a skill" was considered "very important" by 88% of the math instructors, but only 13% of anthropology/interdisciplinary social science teachers and 11% of sociology instructors concurred with this assessment. "Relationship of concepts to student's own values" was considered to be least important, despite strong emphasis of this point in the social sciences. Instructors with less than 3 years of experience were less likely than more experienced faculty to consider "Relationship of concepts to student's own values" important.

Grading practices were found to be fairly standardized, 74% of the class sections were graded ABCDF, and 15% ABCD/No Credit. ABC/No Credit is used sparingly (6%) and Pass/Fail and Pass/No Credit were used even less. Private colleges used ABCDF almost exclusively. Medium size urban colleges showed the most flexibility in grading schemes.

Instructors recommended that their students attend a wide range of out-of-class activities, but these activities were rarely required. Films and field trips were required by around 5% of the faculty, with field trips required in 26% of the agriculture classes. Television programs, outside lectures, and tutoring were recommended by about one-third of the faculty.

Faculty were asked to note what types of assistance was available, and whether the assistance was utilized. Clerical help was most widely available (82%), and was utilized by 69%. Tutors, media production, and library assistance were all employed by about one-third of the instructors.

Lab assistants were available to 25% of the instructors, and 81% of these instructors chose to utilize their help. Full-time faculty indicated that more assistance was available to them, and faculty in private colleges had significantly less assistance available.

We asked about what it would take to make a better class and allowed instructors to check as many of the choices as applied. The overwhelming first choice (53%) was "Students better prepared to handle course requirements," with "Instructor release time to develop course and/or material," and "Availability of more media" close behind (both around 36%). Less than 1% of the faculty wanted fewer or no prerequisites, while 31% wanted stricter prerequisites. Professional development opportunities (25%) and better lab facilities (21%) were also widely noted. Smaller classes were desired by 29% of the teachers (almost 40% in the social sciences), while only 8% wanted larger classes. Sixty-three percent of instructors at private, liberal arts colleges felt they needed more media. Part-timers wanted more freedom to choose materials and more interaction with their colleagues.

Center for the Study of Community Colleges

INSTRUCTOR SURVEY

Your college is participating in a nationwide study conducted by the Center for the Study of Community Colleges under a grant from the National Science Foundation. The study is concerned with the role of the sciences and technologies in two-year colleges — curriculum, instructional practices and course activities.

The survey asks questions about one of your classes offered last fall. The information gathered will help inform groups making policy affecting the sciences. All information gathered is treated as confidential and at no time will your answers be singled out. Our concern is with aggregate instructional practices as discerned in a national sample.

We recognize that the survey is time-consuming and we appreciate your efforts in completing it. Thank you very much.

1a. Your college's class schedule indicated that in Fall, 1977 you were teaching:

_____ 11-13 _____

(Course) (Section)

If this class was assigned to a different instructor, please return this survey to your campus facilitator to give to the person who taught this class.

If the class was not taught, please give us the reason why, and then return the uncompleted survey form in the accompanying envelope.

b. Class was not taught because: (explain briefly) _____

_____

_____

Please answer the questions in relation to the specified class.

2. Approximately how many students were initially enrolled in this class?

Males _____ 14-16

Females _____ 17-19

3. Approximately how many students completed this course and received grades? (Do not include withdrawals or incompletes.)

Males _____ 20-22

Females _____ 23-25

4. Check each of the items below that you believe properly describes this course:

a. Parallel or equivalent to a lower division college level course at transfer institutions . . . . . ☐ 1 — 26

b. Designed for transfer students majoring in one of the natural resources fields (e.g., agriculture, forestry) or an allied health field (e.g., nursing, dental hygiene, etc.) . . . . . ☐ 2

c. Designed for transfer students majoring in one of the physical or biological sciences, engineering, mathematics, or the health sciences (e.g., pre-medicine, pre-dentistry) . . . . . ☐ 3

d. Designed for transfer students majoring in a non-science area . . . ☐ 4

e. Designed for occupational students in an allied health area . . . . ☐ 5

f. Designed for occupational students in a science technology or engineering technology area . . . . . ☐ 6

g. Designed as a high school make up or remedial course . . . . . ☐ 7

h. Designed as a general education course for non-transfer and non-occupational students . . . . . ☐ 8

i. Designed for further education or personal upgrading of adult students . . . . . ☐ 9

j. Other *(please specify):*_____ ☐ 0

5a. Instructors may desire many qualities for their students. Please select the one quality in the following list of four that you most wanted your students to achieve in the specified course.

1) Understand/appreciate interrelationships of science and technology with society . . . . . ☐ 1 — 27

2) Be able to understand scientific research literature . . . . . ☐ 2

3) Apply principles learned in course to solve qualitative and/or quantitative problems . . . . . ☐ 3

4) Develop proficiency in laboratory methods and techniques of the discipline . . . . . ☐ 4

b. Of the four qualities listed below, which one did you most want your students to achieve?

1) Relate knowledge acquired in class to real world systems and problems . . . . . ☐ 1 — 28

2) Understand the principles, concepts, and terminology of the discipline . ☐ 2

3) Develop appreciation/understanding of scientific method . . . . ☐ 3

4) Gain "hands-on" or field experience in applied practice . . . . . ☐ 4

c. And from this list, which one did you most want your students to achieve in the specified class.

1) Learn to use tools of research in the sciences . . . . . ☐ 1 — 29

2) Gain qualities of mind useful in further education . . . . . ☐ 2

3) Understand self . . . . . ☐ 3

4) Develop the ability to think critically . . . . . ☐ 4

6a. Were there prerequisite requirements for this course? Yes ☐ 1 No ☐ 2 — 30

b. IF YES: Which of the following were required? (CHECK AS MANY AS APPLY)

1) Prior course in the same discipline taken in high school ☐ 1 . . college ☐ 7 — 31

2) Prior course in any science taken in high school ☐ 2 . . college ☐ 8

3) Prior course in mathematics taken in high school ☐ 3 . . college ☐ 9

4) Declared science or technology major . . . . . ☐ 4

5) Achieved a specified score on entrance examination . ☐ 5

6) Other *(please specify):*_____ ☐ 6

7. Over the entire term, what percentage of class time is devoted to each of the following:

a. Your own lectures	_____ %	32/33
b. Guest lecturers	_____ %	34/35
c. Student verbal presentations	_____ %	36/37
d. Class discussion	_____ %	38/39
e. Viewing and/or listening to film or taped media	_____ %	40/41
f. Simulation/gaming	_____ %	42/43
g. Quizzes/examinations	_____ %	44/45
h. Field trips	_____ %	46/47
i. Lecture/demonstration experiments	_____ %	48/49
j. Laboratory experiments by students	_____ %	50/51
k. Laboratory practical examinations and quizzes	_____ %	52/53
l. Other *(please specify)*: _____	_____ %	54/55

Please add percentages to make sure they agree with total TOTAL: 100 %

8. How frequently were each of the following instructional media used in this class?

Also check last box if you or any member of your faculty developed any of the designated media for this course. ↓

	Frequently used	Occasionally used	Never used	Developed by self or other faculty member	
a. Films	☐ 1	☐ 2	☐ 3	☐ 4	56
b. Single concept film loops	☐ 1	☐ 2	☐ 3	☐ 4	57
c. Filmstrips	☐ 1	☐ 2	☐ 3	☐ 4	58
d. Slides	☐ 1	☐ 2	☐ 3	☐ 4	59
e. Audiotape/slide/film combinations	☐ 1	☐ 2	☐ 3	☐ 4	60
f. Overhead projected transparencies	☐ 1	☐ 2	☐ 3	☐ 4	61
g. Audiotapes, cassettes, records	☐ 1	☐ 2	☐ 3	☐ 4	62
h. Videotapes	☐ 1	☐ 2	☐ 3	☐ 4	63
i. Television (broadcast/closed circuit)	☐ 1	☐ 2	☐ 3	☐ 4	64
j. Maps, charts, illustrations, displays	☐ 1	☐ 2	☐ 3	☐ 4	65
k. Three dimensional models	☐ 1	☐ 2	☐ 3	☐ 4	66
l. Scientific instruments	☐ 1	☐ 2	☐ 3	☐ 4	67
m. Natural preserved or living specimens	☐ 1	☐ 2	☐ 3	☐ 4	68
n. Lecture or demonstration experiments involving chemical reagents or physical apparatus	☐ 1	☐ 2	☐ 3	☐ 4	69
o. Other *(please specify)*: _____	☐ 1	☐ 2	☐ 3	☐ 4	70

9. **Which of the following materials were used in this class? CHECK EACH TYPE USED. THEN, FOR EACH TYPE USED, PLEASE ANSWER ITEMS A-D.**

	A.	B.			C.		D.			
							How much say did you have in the selection of these materials?			
Check Materials Used	How many pages in total were students required to read?	How satisfied were you with these materials? Well-satisfied	Would like to change them	Definitely intend changing them	Did you prepare these materials? Yes	No	Total say	Selected them but had to verify with a chairperson or administrator	Was member of a group that selected them	Someone else selected them
☐ 1 Textbooks	_____ 13-15	16 ☐ 1	☐ 2	☐ 3	17 ☐ 1	☐ 2	18 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 2 Laboratory materials and workbooks	_____ 19-21	22 ☐ 1	☐ 2	☐ 3	23 ☐ 1	☐ 2	24 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 3 Collections of readings	_____ 25-27	28 ☐ 1	☐ 2	☐ 3	29 ☐ 1	☐ 2	30 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 4 Reference books	_____ 31-33	34 ☐ 1	☐ 2	☐ 3	35 ☐ 1	☐ 2	36 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 5 Journal and/or magazine articles	_____ 37-39	40 ☐ 1	☐ 2	☐ 3	41 ☐ 1	☐ 2	42 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 6 Newspapers	_____ 43-45	46 ☐ 1	☐ 2	☐ 3	47 ☐ 1	☐ 2	48 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 7 Syllabi and handout materials	_____ 49-51	52 ☐ 1	☐ 2	☐ 3	53 ☐ 1	☐ 2	54 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 8 Problem books	_____ 55-57	58 ☐ 1	☐ 2	☐ 3	59 ☐ 1	☐ 2	60 ☐ 1	☐ 2	☐ 3	☐ 4
☐ 9 Other *(please specify)* _____	_____ 61-63	64 ☐ 1	☐ 2	☐ 3	65 ☐ 1	☐ 2	66 ☐ 1	☐ 2	☐ 3	☐ 4

10. Please indicate the emphasis given to each of the following student activities in this class.

	Not included in determining student's grade	Included but counted less than 25% toward grade	Counted 25% or more toward grade	
a. Papers written outside of class	☐ 1	☐ 2	☐ 3	67
b. Papers written in class	☐ 1	☐ 2	☐ 3	68
c. Quick-score/objective tests/exams	☐ 1	☐ 2	☐ 3	69
d. Essay tests/exams	☐ 1	☐ 2	☐ 3	70
e. Field reports	☐ 1	☐ 2	☐ 3	71
f. Oral recitations	☐ 1	☐ 2	☐ 3	72
g. Workbook completion	☐ 1	☐ 2	☐ 3	73
h. Regular class attendance	☐ 1	☐ 2	☐ 3	74
i. Participation in class discussions	☐ 1	☐ 2	☐ 3	75
j. Individual discussions with instructor	☐ 1	☐ 2	☐ 3	76
k. Research reports	☐ 1	☐ 2	☐ 3	77
l. Non-written projects	☐ 1	☐ 2	☐ 3	78
m. Homework	☐ 1	☐ 2	☐ 3	79
n. Laboratory reports	☐ 1	☐ 2	☐ 3	80
o. Laboratory unknowns and/or practical exams (quantitative and qualitative)	☐ 1	☐ 2	☐ 3	12
p. Problem sets	☐ 1	☐ 2	☐ 3	13
q. Other *(please specify):*_____	☐ 1	☐ 2	☐ 3	14

11. Examinations or quizzes given to students may ask them to demonstrate various abilities. Please indicate the importance of each of these abilities in the tests you gave in this course. (CHECK ONE BOX FOR EACH ITEM)

	Very important	Somewhat important	Not important	
a. Mastery of a skill	☐ 1	☐ 2	☐ 3	15
b. Acquaintance with concepts of the discipline	☐ 1	☐ 2	☐ 3	16
c. Recall of specific information	☐ 1	☐ 2	☐ 3	17
d. Understanding the significance of certain works, events, phenomena, and experiments	☐ 1	☐ 2	☐ 3	18
e. Ability to synthesize course content	☐ 1	☐ 2	☐ 3	19
f. Relationship of concepts to student's own values	☐ 1	☐ 2	☐ 3	20
g. Other *(please specify):*_____	☐ 1	☐ 2	☐ 3	21

12. What was the relative emphasis given to each type of question in written quizzes and examinations? (PLEASE RESPOND BY CHECKING ONE OF THE THREE BOXES FOR EACH ITEM.)

	Frequently used	Seldom used	Never used	
a. Multiple response (including multiple choice and true/false)	☐ 1	☐ 2	☐ 3	22
b. Completion	☐ 1	☐ 2	☐ 3	23
c. Essay	☐ 1	☐ 2	☐ 3	24
d. Solution of mathematical type problems where the work must be shown	☐ 1	☐ 2	☐ 3	25
e. Construction of graphs, diagrams, chemical type equations, etc.	☐ 1	☐ 2	☐ 3	26
f. Derivation of a mathematical relationship	☐ 1	☐ 2	☐ 3	27
g. Other *(please specify):*_____	☐ 1	☐ 2	☐ 3	28

17a. Which of these types of assistance were available to you last term? CHECK AS MANY AS APPLY.

b. Which did you utilize? CHECK AS MANY AS APPLY.

	a. Assistance was available to me in the following areas	b. Utilized
a. Clerical help	47- ☐ 1	48- ☐ 1
b. Test-scoring facilities	☐ 2	☐ 2
c. Tutors	☐ 3	☐ 3
d. Readers	☐ 4	☐ 4
e. Paraprofessional aides/instructional assistants	☐ 5	☐ 5
f. Media production facilities/assistance	☐ 6	☐ 6
g. Library/bibliographical assistance	☐ 7	☐ 7
h. Laboratory assistants	☐ 8	☐ 8
i. Other *(please specify):*_____	☐ 9	☐ 9

18. Although this course may have been very effective, what would it take to have made it better? CHECK AS MANY AS APPLY.

a. More freedom to choose materials	☐ 1	49
b. More interaction with colleagues or administrators	☐ 2	
c. Less interference from colleagues or administrators	☐ 3	
d. Larger class (more students)	☐ 4	
e. Smaller class	☐ 5	
f. More reader/paraprofessional aides	☐ 6	
g. More clerical assistance	☐ 7	
h. Availability of more media or instructional materials	☐ 8	
i. Stricter prerequisites for admission to class	☐ 9	
j. Fewer or no prerequisites for admission to class	☐ 1	50
k. Changed course description	☐ 2	
l. Instructor release time to develop course and/or material	☐ 3	
m. Different goals and objectives	☐ 4	
n. Professional development opportunities for instructors	☐ 5	
o. Better laboratory facilities	☐ 6	
p. Students better prepared to handle course requirements	☐ 7	
q. Other *(please specify):*_____	☐ 8	

Now, just a few questions about you . . .

19. How many years have you taught in any two-year college? 51

- a. Less than one year . . . . . ☐ 1
- b. 1-2 years . . . . . ☐ 2
- c. 3-4 years . . . . . ☐ 3
- d. 5-10 years . . . . . ☐ 4
- e. 11-20 years . . . . . ☐ 5
- f. Over 20 years . . . . . ☐ 6

20. At this college are you considered to be a: 52

- a. Full-time faculty member . . . . . ☐ 1
- b. Part-time faculty member . . . . . ☐ 2
- c. Department or division chairperson . . . ☐ 3
- d. Administrator . . . . . ☐ 4
- e. Other *(please specify):*

  _____ . . . ☐ 5

21a. Are you currently employed in a research or industrial position directly related to the discipline of this course? 53

Yes ☐ 1
No ☐ 2

b. IF YES: For how many years?_____ 54/55

c. If previously you had been employed in a related industry or research organization, please indicate the number of years:_____ 56/57

22. What is the highest degree you presently hold? 58

- a. Bachelor's . . . . . ☐ 1
- b. Master's . . . . . ☐ 2
- c. Doctorate . . . . . ☐ 3

IMPORTANT INSTRUCTIONS

Thank you for taking the time to complete this survey. Please seal the completed questionnaire in the envelope which is addressed to the project facilitator on your campus and return it to that person. After collecting the forms from all participants, the facilitator will forward the sealed envelopes to the Center.

We appreciate your prompt attention and participation in this important survey for the National Science Foundation.

Arthur M. Cohen
Principal Investigator

Florence B. Brawer
Research Director